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ABSTRACT

A game-oriented curriculum was devised to promote the cognitive-language and social-emotional development of preschool children from low socioeconomic backgrounds. The Illinois Test of Psycholinguistic Abilities, supplemented by Guilford's Structure of the Intellect, served as models. The games included such materials as card packs, models and miniatures, game boards, duplicate pictures, puzzles, and pictures with missing parts, and were designed to foster such skills as sorting, matching, classifying, sequencing, labeling, recalling, associating, generalizing, problem solving, and communicating essential information. For the summative evaluation, a traditional informal preschool program was compared with an experimental program in which structured games served as the principal instructional intervention. Intellectual development was measured before the program and at six other times until high school. At the end of the second grade, adaptations of standard attitude and sociometric measures assessed socio-emotional development. Results showed significant differences favoring the experimental group on IQ at the end of preschool and kindergarten; differences between groups did not persist over time. On sociometric measures, the experimental group demonstrated more positive perceptions of attitudes of acceptance by parents, peers and teachers than their counterparts. Formative evaluation consisted of a description of the process for developing the games from initial conception to commercial production. Factors which contributed to the success of the games as an instructional intervention were identified and reviewed. In general, results supported the use of instructional games to foster cognitive and language development among preschoolers; however, further research was strongly recommended. (Author/CP)

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GAMES AS AN INSTRUCTION STRATEGY IN EARLY CHILDHOOD EDUCATION: SUMMATIVE AND FORMATIVE EVALUATIONS

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Introduction

The design of educational environments that are sensitive to the varied, complex, and often subtle needs of young children continues to challenge curriculum developers. A decade of experience with preschool programs carried out in a variety of settings has, however, convinced many early childhood educators the value of a systematic and structured approach (Brofenbrenner, 1975; Hunt, 1975; Tjossem, 1976; and Karnes and Teska, 1975). Accordingly, a variety of instructional strategies have been developed to implement relatively structured curricula. These include a reliance on pattern drill (Distar), on carefully constructed materials designed to provide quality experiences (Montessori and Piagetian programs), and on structured games (Karnes Ameliorative Program). A review of the early education literature suggests that the use of games as an instructional strategy is gaining in popularity; indeed, the number of early childhood programs that report the use of game stretegies to enhance the cognitive, language, socioemotional and motor development of young children has increased dramatically in the past five years (Evans, 1975).

Despite its growing popularity, surprisingly little research has been undertaken to evaluate the effectiveness of structured games as an instructional strategy in the preschool. In fact, almost all of the research reported to date has been conducted with primary and elementary school children or with adolescents (Coleman, 1969). The bulk of this literature endorses the use of games to foster analytical thinking and problem solving skills of young children. Various researchers (e.g., Avendon and Sutton-Smith, 1971; Coleman, 1969) have found that games are effective in teaching primary and elementary school children decision-making skills, in encouraging goal-oriented behavior, in promoting reflective thinking and in helping children to assimilate newly acquired logical abilities. One study (Kennedy and Newman, 1976) indicated that children persist longer at tasks presented in the form of games than when similar tasks were offered in other, more common instructional formats. While these findings are encouraging for those who use games as an instructional strategy in the preschool, it is impossible to know without further study whether these data generalize to younger children. The lack of empirical data on the effectiveness of games with preschoolers, coupled with the increasing use of games in preschool settings, argues strongly for investigation in this area.

This paper reports on a study designed to evaluate the effectiveness of structured games as an instructional procedure for promoting the cognitive/language and social-emotional development of preschool children from disadvantaged socioeconomic backgrounds. More specifically, this study was designed to compare short- and long-term effects of two preschool interventions on comparable groups of four-year-old children from low socioeconomic backgrounds. Both intervention programs were under the direction of Dr. Merle B. Karnes at the University of Illinois.

Program Description

The first program, referred to as the traditional approach, had as its major goal to promote the personal, motor, and general language development of the children. Generally, teachers in the traditional classrooms were more informal and less directive in their instructional approach. Throughout the day's activities--which included music, art, indoor and outdoor play, a story period, and snack--teachers capitalized on opportunities for informal and incidental learning by encouraging children to talk and to ask questions and by generally stimulating the interest of children in the activities made available in the preschool environment. Observers in the traditional classrooms typically found the teacher moving from one child to another, adjusting her/his interactions to each, asking questions of individual children and at times of the entire group, providing for the extensive use of materials, and promoting child-child interactions whenever possible. Additionally, through regular inservice training, teachers in the traditional program were made aware of each child's behavioral strengths and weaknesses.

The second program GOAL (Game Oriented Activities for Learning), was a structured preschool intervention in which games were used to promote the cognitive/language and social-emotional development of children from low-income families. The games used as the principal instructional strategy were derived from the communication model of the Illinois Test of Psycholinguistic Abilities (ITPA) and the cognitive model derived from Guilford's Structure of the Intellect (SOI). The games relied on such materials as card packs, models and miniatures, game boards, duplicate pictures, puzzles, and pictures with missing parts and were designed to foster such skills as sorting, matching, classifying, sequencing, labeling, recalling, associating, generalizing, problem solving, and communicating essential information to others. Because inadequate language development was the greatest problem area for the young children in this study, verbalizations in conjunction with the manipulation of concrete materials were considered to be the most effective means of establishing new language responses.

Each day, three twenty-minute periods were set aside to teach skills through teacher-made games. Small groups, usually one teacher and five students, were formed during these periods, and one period was devoted to language, another to mathematical concepts, and a third to social studies and science concepts. In addition to the small-group instructional sessions, less structured activities including play, music, and art completed the preschool day. During these activities, especially freeplay, teachers took advantage of opportunities to reinforce concepts taught in the small-group settings with other materials and different language cues. Through this technique, the possibilities for transfer of learning were enhanced.

The justification for the use of the game format as the principal instructional strategy in the GOAL program was supported by teacher testimony and observation. Games, for example, helped to assure the teacher of a match between a given instructional task and a child's current level of functioning in a curriculum area. Additionally, from the teacher's point of view, use of games encouraged a structured but flexible teaching style. Games were also

observed to elicit a high level of motivation and task-oriented behavior from the children. Still another reason was the way games could be used to promote productive interaction between children. Games provided multiple opportunities for social learning; children acquired such interpersonal skills as taking turns and sharing materials and ideas. Frequently, less advanced children were observed imitaing their developmentally more skilled peers. Games also created a healthy competitive situation. Children were not only able to compare their present with their past performance, but they also were able to compare their performance levels with those of their peers. Another justification for the use of games was that it encouraged the reinforcement of basic skills and concepts in a situation where repetition was fun rather than boring as it so often is when pattern drill is used. And finally, teachers using the game strategy enjoyed it immensely, and their enthusiasm, more often than not, was transferred to the children.

Subject Selection

To locate potential subjects, families in Champaign-Urbana, a community of 100,000 in central Illinois, who had been designated as "disadvantaged" by public aid and school personnel were contacted to determine if they had a child four years old or a child who would turn four before December 1st. The December cut-off was chosen because it was also the date that would determine which children would enter public kindergarten the following year; consequently, follow-up evaluations could be efficiently coordinated with the public schools. In addition to these referrals, trained interviewers canvased the disadvantaged sections of the community to locate children new to the area and as yet unregistered with referral agencies. After potential subjects were identified, final eligibility was determined by a home interview.

All eligible children were administered the 1960 Stanford-Binet Intelligence Test, and the intelligence quotients of the children were stratified into three groups: 1) IQ scores of 100 and above (high); 2) 90 through 99 (middle); and 3) 70 through 89 (low). Children were then assigned to classrooms (N=15) where one-third of the class consisted of children in the high IQ range; one-third in the middle range; and one-third in the low range. The mean IQ of the children in each classroom was 95. Substitutions between classes were made to ensure an approximate ratio of 67% Negro children and 33% Caucasion children; approximately 50% of the children in each class were male and 50% female.

Mean intelligence quotients were computed for each class unit of fifteen children. These means were evaluated for comparability among class units as a whole and for strata among classes. Each class unit was then randomly assigned to either the Traditional or the GOAL Program. The initial composition of the groups is summarized in Table 1.

Table 1

Initial Composition of the Two Groups

Group	N	Mean C.A.	Mean Binet IQ	Race		Sex	
				Caucasian	Black	Male	Female
Experimental (GOAL)	27	51.9	95.46	9	18	13	14
Traditional	28	52.3	94.50	12	16	15	13

Summative Evaluation

The summative evaluation data reported here consists of comparisons of intellectual and socioemotional development between subjects in the GOAL Program which employed structured games as its primary instructional strategy and subjects in the traditional approach. Intellectual development was measured with the Stanford-Binet Intelligence Scale and social-emotional development with adaptations of standard attitudes and sociometric measures. The results reported here represent data analyzed to date; Karnes continues to analyze and collect data from the children in these two groups.

Intelligence Quotients

T-tests were performed on the mean Binet IQ scores for subjects in the GOAL and in the traditional group. Table 2 presents this comparison for children at seven points in time: 1) pre-intervention; 2) immediate post-intervention; 3) end of kindergarten; 4) end of first grade; 5) end of second grade; 6) end of third grade; and 7) high school. As the table shows, significant differences in intelligence quotient were obtained favoring the GOAL group immediately following preschool intervention ($P > .02$). Moreover, these superior gains were maintained through the kindergarten year ($P > .01$). Subsequent testing after kindergarten, however, failed to produce significant differences in IQ between the groups.

The superior short-term performance for the GOAL group over the traditional group cannot, of course, be attributed exclusively to the game strategy. In a social milieu as complex as the preschool classroom, results are more likely due to a combination of factors including teacher training, peer influence, and a child's individual history. It is admittedly difficult to isolate the relative contribution of each variable. Still, the structured games were the principle instructional procedure in the GOAL group and undoubtedly made a significant contribution to the results. At the very least, these results offer considerable encouragement to those who rely on structured games to influence intellectual growth among preschool children. Moreover, these results seem consistent with the general trend of the short-term data collected from older children who participated in studies whose format emphasized structured games.

The failure of differences between groups to persist over time is more difficult to explain, and no single hypothesis is likely to be sufficient. One explanation is that after kindergarten children often encounter radical changes in curriculum style, passing from a game-oriented format to one that stresses workbooks and short, specific, convergent responses. Such a radical procedural change may erase gains made by an experimental group.

But perhaps the most plausible explanation is that a number of variables interact overtime to alter intelligence quotient, especially among disadvantaged children where radical changes in home and school environments can occur

Table 2

T-test Comparisons of Traditional and Karnes Experimental (GOAL) on Standford-Binet IQ Scores for Seven Testing Dates

Test Date	Group	Mean	Standard Deviation	T Value	2-Tail Probability
Pre-Intervention	Group 1 (Traditional)	94.5	2.04	-.34	.735
	Group 2 (Karnes Exp.)	95.46	1.95		
Post Intervention	Group 1	102.57	12.06	-2.41	.020*
	Group 2	109.38	8.50		
Kindergarten	Group 1	99.60	12.80	-2.60	.012**
	Group 2	108.50	12.01		
First Grade	Group 1	100.29	13.53	-1.22	.227
	Group 2	104.33	9.92		
Second Grade	Group 1	100.00	12.16	-.92	.362
	Group 2	103.45	14.19		
Third Grade	Group 1	100.44	12.58	-.62	.540
	Group 2	102 95	15.70		
High School	Group 1	88.26	13.31	.88	.388
	Group 2	84.33	12.72		

* $P \geq .05$

** $P \geq .01$

rapidly. Since procedures to isolate and measure these variables continue to elude the social scientist, short-term gains may be all we can expect and, as a result, the recognition that short-term outcomes have merit gains in significance.

Social-Emotional Measures

It has recently been argued (Broffenbrenner, 1975) that highly structured preschool programs designed to remediate verbal and cognitive deficits of preschool children may, in the process, impede social-emotional growth. Little data, however, has been brought to bear on this question. A second purpose of the summative evaluation was, therefore, to assess the social-emotional growth of children in both the GOAL and the traditional group following intervention. Accordingly, 55 of the original 60 subjects, 27 in the GOAL group and 28 in the traditional group, were tested at the end of second grade on four sociometric instruments designed to assess the child's perceptions of attitudes of acceptance by parents, peers and teachers.

1) Perceived Parent Attitude. Subjects in both groups were administered the Perceived Parent Attitude Scale (Ausubel, 1954; adapted for use with young children by Karnes, et al., 1961) to determine if children in one group perceived themselves as being more accepted by their parents than did children in the other group. A trend in favor of the subjects who had attended the structured preschool program was noted, but this trend was not significant.

2) Perceived Peer Attitude Scale. Subjects in both groups were administered a fifty-item questionnaire selected from the California Test of Personality adapted for use with young children (Karnes, et. al., 1961) to determine the child's perception of peer attitudes. Results showed that second graders from the structured GOAL group perceived themselves as being significantly more accepted by their peers than did second graders who had attended the traditional preschool ($P > .05$).

3) Acceptance by Peers. An eight-item sociometric instrument designed by the Karnes staff was administered to elicit the social preferences of all members of any second-grade class in which a subject from the study was currently enrolled. On seven of eight items members of the structured GOAL group were more highly preferred by their second-grade classmates ($P > .05$). Overall, then, these findings indicate preference among peers for children who had attended the structured preschool.

4) Perceived Teacher Attitude Scale. To determine perceived teacher attitudes, the Perceived Parent Attitude Scale (Ausubel, 1954) was adapted by substituting the word "teacher" for the word "parent" while maintaining the basic questions. Second graders from the GOAL group perceived positive teacher attitudes of acceptance far more often than did second graders from the traditional group, and this difference was significant at the .01 level.

Taken together, these findings establish that three years after the intervention, disadvantaged children who had attended a preschool program that was academically oriented and relied on games as the principal instructional strategy, achieved a higher level of social acceptance than did subjects who had attended a traditional preschool. These data tentatively suggest that preschool programs which emphasize academic readiness and a structured format may continue to do so without fear of retarding the social development of young children. Of course, more extensive research is needed before definitive claims can be made regarding this issue.*

*Data reported here on socio-emothonal development were drawn from The Relationship of Two Preschool Approaches to Social Adjustment Effects at Second Grade, a doctoral dissertation by Ronald Domagala, Department of Special Education, University of Illinois, 1975. The author's are grateful to Dr. Domagala for permission to summarize these results.

Formative Evaluation

While the main focus of this study is on the summative comparison of the effectiveness of two intervention programs, a formative evaluation of the process for developing the games merits discussion for at least two reasons. First, the games served as the principal intervention procedures with the experimental or goal group. By describing their development, we can further characterize the nature of the experimental intervention. Secondly, in spite of the increased use of games as an instructional procedure in preschool settings, few descriptions of how to develop effective instructional games for preschool children exist. Yet, such descriptions may be useful to both curriculum developers and teachers as models for their own game-oriented curriculum. For these reasons, the process for developing the GOAL games is described in the following steps.

Step I: Choosing an instructive model for the organization of the games.

Since language is at the heart of learning, it was deemed important to select a communication model that broadly delineated the components of language. A model derived from the clinical model of the Illinois Test of Psycholinguistics was judged to meet these criteria and, as mentioned previously, this model was supplemented with the SOI model.

Step II: Training the teaching staff to use the model to develop games.

Staff members were trained to understand the models through lecture-discussion. They then went on to write activities which represented each component of the models and to presenting these activities to the group to determine whether or not a given activity did indeed focus on the component it was designed to represent. At this point teachers did not write lesson plans and the nature of the content was not felt to be critical. Instead, the purpose of writing these activities was to familiarize the staff with the ITPA and SOI models.

Step III: Determining the content of the lessons.

After selecting the instructive models and training the teaching staff in their use, curriculum content was identified. Appropriate content for three to five year old children was determined as follows:

1) Brainstorming ideas by teachers involved in the program who had been working with young children
2) Reviewing children's books and the general child development literature to determine the frequency of occurrence of certain contents
3) Observing interests of children in the classroom, during outdoor play, and on field trips

4) Determing the interests of the teachers through informal survey

5) Ascertaining the feasibility of providing concrete learning experiences at school and in the immediate community

6) Determining information that can be organized into logical categories, such as foods(color, taste, basic food group, sources, preparation)

7) Determing the extent to which the curriculum content lends itself to logical sequence

8) Assessing the extent to which transfer of learning is possible, for example locating shapes in different objects in the child's environment

9) Reviewing curriculum guides for kindergarten and first grade in order to determine what children need to know to engage successfully in learning at those levels

Step IV: Determing the format of the lesson plans.

Through a series of meetings with teachers, the developer devised a format that appeared to include the information necessary to implement the game strategy. The format consisted of six major parts. Part 1 stated the long range goal to be achieved. Part 2 specified the behavioral objectives necessary to achieve the major goal. Part 3 listed the materials needed to complete the lesson. Part 4, the major portion of the lesson, outlined the procedure for presenting the game. This section specified the physical environment in which the game was to be played and outlined suggestions for promoting appropriate interaction among the children, for motivating them to participate, and for sustaining their interest. Suggestion were also given for helping the child who responds incorrectly to learn the correct response. To facilitate optimal learning during the game, appropriate dialogue was suggested. Part 5 described an activity (the criterion activity) that tested whether or not the child had learned what the game purported to teach. Care was taken not to introduce new concepts and skills at this point and to test only those concepts taught in the lesson itself. Part 6, and the final section, offered at least two ways to reinforce or extend the lesson.

Teachers were encouraged to write the lesson plans in detail and with sufficient clarity so that others could readily teach the lessons.

Step V: Developing the lessons.

The developer conducted a weekly curriculum workshop in which the teachers were trained to write lesson plans. After the format had been mastered, each teacher was asked to devise one game, following the lesson plan format, for each of the eleven ITPA components. The curriculum content generated during Step III was used as the basis for these games. Teachers were urged to suggest ways that games could be adapted to meet the needs of children at different developmental levels.

Step VI: Testing the games in the laboratory.

After the games had been taught to the various preschool classes, teachers informally discussed the strengths and weaknesses of the games and revised them accordingly. Among the criteria for evaluating each game were:

1) clarity of directions
2) suitability of materials
3) logical order of presentation
4) applicability of suggested dialogue
5) compatibility of behavioral objective to the game and criterion activity
6) extent to which the children enjoyed the game
7) enthusiasm the teacher felt as she taught the game
8) match between a child's stage of development and the expectations of the game
9) extent to which the activity could be easily adapted to children of various developmental levels and handicapping conditions
10) extent to which the concepts taught in the game could generalize to other settings

Step VII: Field testing the games at nearby sites.

Over three years some three hundred games were developed, tested, and sequenced in the laboratory setting. Duplicate copies of each game were then disseminated at field test sites in nearby settings. The criteria mentioned in Step VI were used by site teachers to evaluate the lessons. Revisions were made by the developer and staff on the basis of this feedback.

Step VIII: Field testing the games in various parts of the country.

To determine the applicability of the games with different populations in different settings, the games were field tested in various regions of the country. Systematic feedback by mail was obtained through a specially prepared form. Site visits when possible enable the developer to discuss the games with field test users and to gain further insight regarding their refinement. The developer and staff then revised the games for publication.

Step IX: Presenting the games for publication and selecting a publisher.

Following substantive revision by the developer, the text for the games and a list of materials to accompany the lessons were submitted to publishers. The developer then made a presentation of the game curriculum to a group of publishers. Several publishers were provided with review copies of the games. After ample time for review, a publisher was selected who had the capability to develop and publish materials that would appeal to teachers and young children.

Step X: Working with the publisher to ready the product for the market.

The publisher and developer determined initially what was needed to publish the games in an appropriate format and at a realistic cost. Decisions had to be reached regarding art work, size and type of print, games, packaging, specific content of picture cards, durability, variety, and versatility of materials, and lesson plan format.

The publisher then negotiated with departments within the company and with other companies regarding the manufacture and printing of essential materials. Cost analyses of various components of the game curriculum was determined. At this time, decisions had to be made by publisher and developer to enable the publisher to stay within the budget set for producing the complete program. As a result, some materials were eliminated and some substitutions were made; certain lesson plans were discarded and others were revised.

Summary

This paper reports results from a summative and formative evaluation of a game-oriented curriculum for preschool children from low socioeconomic backgrounds. The summative evaluation consisted of a comparison of two groups: 1) a traditional preschool program and 2) an experimental program in which structured games served as the principal instructional intervention. Groups were assessed on the Stanford-Binet IQ test (Form L-M) at seven different times and on a set of standard attitude and sociometric measures administered at the end of second grade. Results showed significant differences favoring the experimental group on IQ at the end of preschool and kindergarten. On sociometric measures, children in the experimental group demonstrated more positive perceptions of attitudes of acceptance by parents, peers and teachers than their counterparts in the traditional program.

Formative evaluation consisted of a description of the process for developing the games from initial conception to commercial production. Factors which contributed to the success of the games as an instructional intervention were identified and reviewed.

In general, the results reported here offer considerable encouragement and support to workers and students in early childhood education who wish to rely on instructional games to foster cognitive and language development among young children. Further research, however, is strongly recommended.

References

1. Avendon, E. M. and Sutton-Smith, B. Study of games. New York: John Wiley and Sons, Inc., 1976.

2. Bronfenbrenner, U. Is early intervention effective? In B. Z. Friedlander, G. M. Sterrit, and G. E. Kirk (Eds.), Exceptional infant (Vol. 3). New York Brunner/Mazel, 1975.

3. Coleman, J. S. Learning through games--A new approach to problem solving. Washington, D. C.: Public Affairs Press, 1969.

4. Evans, E. D. Contemporary influences in early childhood education. (2nd ed.). New York: Holt, Rinehart and Winston, 1975.

5. Hunt, J. M. Reflections on a decade of early education. Journal of Abnormal Child Psychology, 1975, 3 (2), 75-300.

6. Karnes, M. B. and Teska, J. A. Children's responses to intervention programs. In J. J. Gallagher (Ed.), The application of child development research to exceptional children. Reston, Virginia: The Council for Exceptional Children, 1975,

7. Kennedy, B. T. and Newman, M. A. An exploratory study of the effects of games on the development of cognitive skills in young children. Paper presented at Annual Meeting of A.E.R.A., 1976.

8. Tjossem, R. D. (Ed.). Intervention strategies for high risk infants and young children. Baltimore: University Park Press, 1976.